



# Intel Virtual Interface (VI) Architecture *Developer's* Guide

## Error Table Supplement

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# 1. VI Error Table Supplement

## 1.1. How to Read the Error Tables

In the following sections, there is one Table for each type of operation that can be initiated by posting a descriptor (Send, RDMA Write with Immediate Data, RDMA Write no Immediate Data, RDMA Read) and one table for non-descriptor based errors. The term “Local Endpoint” is the endpoint at which the operation was initiated. The “Remote Endpoint” is the endpoint that will respond to the operation. (eg. for the Send Operation Table, the Local Endpoint is where the Send was posted, the Remote Endpoint is where a Receive should be posted that describes where the data in the Send Packet should be placed.

The format of a table entry is illustrated below.

### Table Entry Elements

- Description of Error
- Reliability Level  
UD = Unreliable Delivery  
RD = Reliable Delivery  
RR = Reliable Reception
- Error Symbols  
Symbols in this column apply to a specific reliability level. Refer to “Symbol Key”  
Symbols in the Matrix of Errors apply to that specific error case.
- Matrix of Errors Reported  
The error reported for each specific error case is defined by:
  - Endpoint where the Error was detected/occurred.
  - Endpoint where the Error is reported.
  - Reliability Level.

## 1.2. Packet/Transport Errors

Transport error reporting is highly dependent on the Reliability Level. Within a given Reliability Level, interconnect capabilities and implementation design choices allow for variability in the exact error reported.

One common rule for Packet and Transport errors is that if a descriptor is consumed (i.e. marked done) and the transfer of data did not meet that level's requirements, an appropriate status bit must be set to indicate that the packet completed in error. (eg. A Packet delivered out of sequence is not an error for Unreliable Delivery, but is an error for both Reliable Delivery and Reliable Reception, whereas a delivering corrupted data is an error for all levels of reliability).

### 1.3. Error Symbol Key

Key	Description
☠	Catastrophic Error, the associated WQ (or CQ) is no longer operable.
⊗	Error may not be detectable at the Remote endpoint due to the NIC or Interconnect discarding the Packet
⊗	Error may not be detectable at the Local endpoint due to the NIC or Interconnect discarding the Packet.
Δ	Error detection may be delayed. The actual error detected may be different. e.g. An invalid descriptor address may not be detected until the NIC attempts to use it. A lost packet may not be detected until another packet arrives with a higher sequence number.
N <sub>s</sub>	Not Supported, Descriptors specifying this operation will be completed error.
N <sub>v</sub>	Error condition is not valid in this circumstance.
–	Error Not reported.
∅	Error not detected at this endpoint / Error ignored by this endpoint / Don't Care
OK	Not an error condition
OPT	Reporting an Error at this endpoint is optional.
±	Where multiple errors are shown, either error may be reported (eg. RDMA Read could have a local error on either the outgoing packet or the incoming packet). Which error is reported could be implementation dependent or timing dependent.
≠	Connection Broken. This may be the only notification that an error occurred on this connection.
↔	The NIC or Interconnect must prevent this error from consuming a descriptor.
UD	Unreliable Delivery
RD	Reliable Delivery.
RR	Reliable Reception

## Synchronous Error List

"Synchronous Error Status Name in VI Architecture API description" C language define in vipl.h	
"Local Format Error" VIP_STATUS_FORMAT_ERROR	Bit 1
"Local Protection Error" VIP_STATUS_PROTECTION_ERROR	Bit 2
"Local Length Error" VIP_STATUS_LENGTH_ERROR	Bit 3
"Partial Packet Error" VIP_STATUS_PARTIAL_ERROR	Bit 4
"Descriptor Flushed" VIP_STATUS_DESC_FLUSHED_ERROR	Bit 5
"Transport Error" VIP_STATUS_TRANSPORT_ERROR	Bit 6
"RDMA Protection Error" VIP_STATUS_RDMA_PROT_ERROR	Bit 7
"Remote Descriptor Error" VIP_STATUS_REMOTE_DESC_ERROR	Bit 8

## Asynchronous Error List

"Asynchronous Error Name in VI Architecture API description" C language define in vipl.h	
"Post Descriptor Error" VIP_ERROR_POST_DESC	A 1
"Connection Lost" VIP_ERROR_CONN_LOST	A 2
"Receive Queue Empty" VIP_ERROR_RECVQ_EMPTY	A 3
"VI Overrun" VIP_ERROR_VI_OVERRUN	A 4
"RDMA Write Protection Error" VIP_ERROR_RDMAW_PROT	A 5
"RDMA Write Data Error" VIP_ERROR_RDMAW_DATA	A 6
"RDMA Write Packet Abort" VIP_ERROR_RDMAW_ABORT	A 7
"RDMA Read Protection Error" VIP_ERROR_RDMA_R_PROT	A 8
"Completion Protection Error" VIP_ERROR_COMP_PROT	A 9
"RDMA Write Transport Error" VIP_ERROR_RDMAW_TRANSPORT	A 10
"Catastrophic Error" VIP_ERROR_CATASTROPHIC	A 11

**Send Operation****Table 1: Send Operation**

			<b>Send Operation</b>	<b>Send Operation</b>	<b>Send Operation</b>	<b>Send Operation</b>
			Operation Initiated on the Local Endpoint	Operation Initiated on the Local Endpoint	Operation Initiated on the Local Endpoint	Operation Initiated on the Local Endpoint
Work Queue Error			Error Source and/or Detection on <b>Local</b> Endpoint	Error Source and/or Detection on <b>Local</b> Endpoint	Error Source and/or Detection on <b>Remote</b> Endpoint	Error Source and/or Detection on Remote Endpoint
Error Description			Error Reported to <b>Local</b> endpoint	Error Reported to <b>Remote</b> Endpoint	Error Reported to <b>Remote</b> Endpoint	Error Reported to Local endpoint
No descriptors on the Receive Queue	U D		N/V	N/V	Ø	—
	R D		N/V	N/V	"Receive Queue Empty" A 3	≠
	R R		N/V	N/V	"Receive Queue Empty" A 3	"Remote Descriptor Error" Bit 8
Too Many Descriptors Posted to a queue	U D	⚠	"VI Overrun" A 4	≠	"VI Overrun" A 4	≠
	R D	⚠	"VI Overrun" A 4	≠	"VI Overrun" A 4	≠
	R R	⚠	"VI Overrun" A 4	≠	"VI Overrun" A 4	"Transport Error" Bit 6
Descriptor format error	U D		"Local Format Error" Bit 1	—	"Local Format Error" Bit 1	—
	R D		"Local Format Error" Bit 1	≠	"Local Format Error" Bit 1	≠
	R R		"Local Format Error" Bit 1	≠	"Local Format Error" Bit 1	"Remote Descriptor Error" Bit 8
Descriptor length error	U D		"Local Length Error" Bit 3	—	"Local Length Error" Bit 3	—
	R D		"Local Length Error" Bit 3	≠	"Local Length Error" Bit 3	≠
	R R		"Local Length Error" Bit 3	≠	"Local Length Error" Bit 3	"Remote Descriptor Error" Bit 8

## Send Operation






Invalid Doorbell Token or Next Field	U D	⚠ Δ	"Post Descriptor Error" A 1	≠	"Post Descriptor Error" A 1	≠
	R D	⚠ Δ	"Post Descriptor Error" A 1	≠	"Post Descriptor Error" A 1	≠
	R R	⚠ ±	"Post Descriptor Error" A 1	≠	"Post Descriptor Error" A 1	"Transport Error" Bit 6 "Remote Descriptor Error" Bit 8
The NIC can't access descriptor data segments due to a TPT fault, but can access the Control Segment.	U D		"Local Protection Error" Bit 2	—	"Local Protection Error" Bit 2	—
	R D		"Local Protection Error" Bit 2	≠	"Local Protection Error" Bit 2	≠
	R R		"Local Protection Error" Bit 2	≠	"Local Protection Error" Bit 2	"Remote Descriptor Error" Bit 8
Can't write to descriptor control segment	U D	⚠	"Completion Protection Error" A 9	≠	"Completion Protection Error" A 9	≠
	R D	⚠	"Completion Protection Error" A 9	≠	"Completion Protection Error" A 9	≠
	R R	⚠	"Completion Protection Error" A 9	≠	"Completion Protection Error" A 9	"Remote Descriptor Error" Bit 8
Can't read from a data buffer	U D		"Local Protection Error" Bit 2	—	N/V	N/V
	R D		"Local Protection Error" Bit 2	≠	N/V	N/V
	R R		"Local Protection Error" Bit 2	≠	N/V	N/V
Can't write to a data buffer	U D		N/V	N/V	"Local Protection Error" Bit 2	—
	R D		N/V	N/V	"Local Protection Error" Bit 2	≠
	R R		N/V	N/V	"Local Protection Error" Bit 2	"Remote Descriptor Error" Bit 8





**Send Operation**

Can't read from an RDMA buffer	U D		N/V	N/V	N/V	N/V
	R D		N/V	N/V	N/V	N/V
	R R		N/V	N/V	N/V	N/V
Can't write to an RDMA buffer	U D		N/V	N/V	N/V	N/V
	R D		N/V	N/V	N/V	N/V
	R R		N/V	N/V	N/V	N/V
Can't write to a Completion Queue	U D	⚠	"Completion Protection Error" A 9	≠	"Completion Protection Error" A 9	≠
	R D	⚠	"Completion Protection Error" A 9	≠	"Completion Protection Error" A 9	≠
	R R	⚠	"Completion Protection Error" A 9	≠	"Completion Protection Error" A 9	"Remote Descriptor Error" Bit 8
RDMA Write disabled on VI	U D		N/V	N/V	N/V	N/V
	R D		N/V	N/V	N/V	N/V
	R R		N/V	N/V	N/V	N/V
RDMA Read disabled on VI	U D		N/V	N/V	N/V	N/V
	R D		N/V	N/V	N/V	N/V
	R R		N/V	N/V	N/V	N/V

## Send Operation

Packet arrived with a CRC error  Packet Data was corrupt	U D	 Δ	N/V	N/V	"Transport Error" Bit 6	—
	R D	 Δ	N/V	N/V	"Transport Error" Bit 6	≠
	R R		N/V	N/V	"Transport Error" Bit 6	"Transport Error" Bit 6
NIC sent a partial packet  NIC received a partial or truncated packet	U D	 Δ	"Partial Packet Error" Bit 4	—	"Partial Packet Error" Bit 4	—
	R D	 Δ	"Partial Packet Error" Bit 4	≠	"Partial Packet Error" Bit 4	≠
	R R		"Partial Packet Error" Bit 4	≠	"Partial Packet Error" Bit 4	"Transport Error" Bit 6
Packet arrived out of sequence	U D	○ K	N/V	N/V	∅	—
	R D	 Δ	N/V	N/V	"Transport Error" Bit 6	≠
	R R		N/V	N/V	"Transport Error" Bit 6	"Transport Error" Bit 6
Packet did not arrive.	U D	Δ	N/V	N/V	∅	—
	R D	Δ	N/V	N/V	"Transport Error" Bit 6	≠
	R R		N/V	N/V	"Transport Error" Bit 6	"Transport Error" Bit 6
Packet with duplicate sequence arrived.	U D	↔	N/V	N/V	↔	↔
	R D	↔	N/V	N/V	↔	↔
	R R	↔	N/V	N/V	↔	↔

**Send Operation**

Packet is missing cell(s).	U D	$\Delta$	$N/V$	$N/V$	"Partial Packet Error" Bit 4	—
	R D	 $\Delta$	$N/V$	$N/V$	"Partial Packet Error" Bit 4	$\neq$
	R R		$N/V$	$N/V$	"Partial Packet Error" Bit 4	"Transport Error" Bit 6
Packet with duplicate sequence arrived.	U D	$\leftrightarrow$	$N/V$	$N/V$	$\leftrightarrow$	$\leftrightarrow$
	R D	$\leftrightarrow$	$N/V$	$N/V$	$\leftrightarrow$	$\leftrightarrow$
	R R	$\leftrightarrow$	$N/V$	$N/V$	$\leftrightarrow$	$\leftrightarrow$
Packet is missing cell(s).	U D	$\Delta$	$N/V$	$N/V$	"Partial Packet Error" Bit 4	—
	R D	 $\Delta$	$N/V$	$N/V$	"Partial Packet Error" Bit 4	$\neq$
	R R		$N/V$	$N/V$	"Partial Packet Error" Bit 4	"Transport Error" Bit 6

**RDMA Write (with Immediate Data) Operation****Table 2: RDMA Write (with Immediate Data) Operation**

			<b>RDMA Write Operation</b> (w/Immediate Data)	<b>RDMA Write Operation</b> (w/Immediate Data)	<b>RDMA Write Operation</b> (w/Immediate Data)	<b>RDMA Write Operation</b> (w/Immediate Data)
			Operation Initiated on the Local Endpoint	Operation Initiated on the Local Endpoint	Operation Initiated on the Local Endpoint	Operation Initiated on the Local Endpoint
Work Queue Error			Error Source and/or Detection on <b>Local</b> Endpoint	Error Source and/or Detection on <b>Local</b> Endpoint	Error Source and/or Detection on <b>Remote</b> Endpoint	Error Source and/or Detection on <b>Remote</b> Endpoint
Error Description			Error Reported to <b>Local</b> endpoint	Error Reported to <b>Remote</b> Endpoint	Error Reported to <b>Remote</b> Endpoint	Error Reported to <b>Local</b> endpoint
No descriptors on the Receive Queue	<b>U</b> <b>D</b>		<b>N/V</b>	<b>N/V</b>	∅	—
	<b>R</b> <b>D</b>		<b>N/V</b>	<b>N/V</b>	"Receive Queue Empty" A 3	≠
	<b>R</b> <b>R</b>		<b>N/V</b>	<b>N/V</b>	"Receive Queue Empty" A 3	"Remote Descriptor Error" Bit 8
Too Many Descriptors Posted to a queue	<b>U</b> <b>D</b>	☠	"VI Overrun" A 4	≠	"VI Overrun" A 4	≠
	<b>R</b> <b>D</b>	☠	"VI Overrun" A 4	≠	"VI Overrun" A 4	≠
	<b>R</b> <b>R</b>	☠	"VI Overrun" A 4	≠	"VI Overrun" A 4	"Transport Error" Bit 6
Descriptor format error	<b>U</b> <b>D</b>		"Local Format Error" Bit 1	—	"Local Format Error" Bit 1	—
	<b>R</b> <b>D</b>		"Local Format Error" Bit 1	≠	"Local Format Error" Bit 1	≠
	<b>R</b> <b>R</b>		"Local Format Error" Bit 1	≠	"Local Format Error" Bit 1	"Remote Descriptor Error" Bit 8

**RDMA Write (with Immediate Data) Operation**





Descriptor length error	U D		"Local Length Error" Bit 3	—	"Local Length Error" Bit 3	—
	R D		"Local Length Error" Bit 3	≠	"Local Length Error" Bit 3	≠
	R R		"Local Length Error" Bit 3	≠	"Local Length Error" Bit 3	"Remote Descriptor Error" Bit 8
Invalid Doorbell Token or Next Field	U D	☠ Δ	"Post Descriptor Error" A 1	≠	"Post Descriptor Error" A 1	≠
	R D	☠ Δ	"Post Descriptor Error" A 1	≠	"Post Descriptor Error" A 1	≠
	R R	☠ ±	"Post Descriptor Error" A 1	≠	"Post Descriptor Error" A 1	"Transport Error" Bit 6 "Remote Descriptor Error" Bit 8
The NIC can't access descriptor data segments due to a TPT fault, but can access the Control Segment	U D		"Local Protection Error" Bit 2	—	"Local Protection Error" Bit 2	—
	R D		"Local Protection Error" Bit 2	≠	"Local Protection Error" Bit 2	≠
	R R		"Local Protection Error" Bit 2	≠	"Local Protection Error" Bit 2	"Remote Descriptor Error" Bit 8
Can't write to descriptor control segment	U D	☠	"Completion Protection Error" A 9	≠	"Completion Protection Error" A 9	≠
	R D	☠	"Completion Protection Error" A 9	≠	"Completion Protection Error" A 9	≠
	R R	☠	"Completion Protection Error" A 9	≠	"Completion Protection Error" A 9	"Remote Descriptor Error" Bit 8
Can't read from a data buffer	U D		"Local Protection Error" Bit 2	—	N/V	N/V
	R D		"Local Protection Error" Bit 2	≠	N/V	N/V
	R R		"Local Protection Error" Bit 2	≠	N/V	N/V

**RDMA Write (with Immediate Data) Operation**

Can't write to a data buffer See Footnote <sup>1</sup>	U D		N/V	N/V	"Local Protection Error" Bit 2	—
	R D		N/V	N/V	"Local Protection Error" Bit 2	≠
	R R		N/V	N/V	"Local Protection Error" Bit 2	"Remote Descriptor Error" Bit 8
Can't read from an RDMA buffer	U D		N/V	N/V	N/V	N/V
	R D		N/V	N/V	N/V	N/V
	R R		N/V	N/V	N/V	N/V
Can't write to an RDMA buffer	U D		N/V	N/V	"Local Protection Error" Bit 2	—
	R D		N/V	N/V	"Local Protection Error" Bit 2	≠
	R R		N/V	N/V	"Local Protection Error" Bit 2	"RDMA Protection Error" Bit 7
Can't write to a Completion Queue	U D	☠	"Completion Protection Error" A 9	≠	"Completion Protection Error" A 9	≠
	R D	☠	"Completion Protection Error" A 9	≠	"Completion Protection Error" A 9	≠
	R R	☠	"Completion Protection Error" A 9	≠	"Completion Protection Error" A 9	"Remote Descriptor Error" Bit 8
RDMA Write disabled on VI	U D		N/V	N/V	"Local Protection Error" Bit 2	—
	R D		N/V	N/V	"Local Protection Error" Bit 2	≠
	R R		N/V	N/V	"Local Protection Error" Bit 2	"RDMA Protection Error" Bit 7

<sup>1</sup> Although the Receive Descriptor's data segment is not used in RDMA Write with Immediate Data, some implementations of hardware may pre-fetch one or more data segments and perform the translation and protection check. The Virtual Address and Handle of the data buffers specified in a data segment must be valid.

**RDMA Write (with Immediate Data) Operation**

RDMA Read disabled on VI	U D		N/V	N/V	N/V	N/V
	R D		N/V	N/V	N/V	N/V
	R R		N/V	N/V	N/V	N/V
Packet arrived with a CRC	U D	 $\Delta$	N/V	N/V	"Transport Error" Bit 6	—
	R D	 $\Delta$	N/V	N/V	"Transport Error" Bit 6	$\neq$
	R R		N/V	N/V	"Transport Error" Bit 6	"Transport Error" Bit 6
Partial packet placed on the wire, requires an additional error bit set	U D	$\Delta$	"Partial Packet Error" Bit 4	—	"Partial Packet Error" Bit 4	—
	R D	 $\Delta$	"Partial Packet Error" Bit 4	$\neq$	"Partial Packet Error" Bit 4	$\neq$
	R R		"Partial Packet Error" Bit 4	$\neq$	"Partial Packet Error" Bit 4	"Transport Error" Bit 6
Packet arrived out of sequence	U D	$\Delta$	N/V	N/V	—	—
	R D	 $\Delta$	N/V	N/V	"Transport Error" Bit 6	$\neq$
	R R		N/V	N/V	"Transport Error" Bit 6	"Transport Error" Bit 6
Packet did not arrive	U D	$\Delta$	N/V	N/V	—	—
	R D		N/V	N/V	"Transport Error" Bit 6	$\neq$
	R R		N/V	N/V	"Transport Error" Bit 6	"Transport Error" Bit 6

**RDMA Write (with Immediate Data) Operation**

Packet with duplicate sequence arrived	U D	↔	N/V	N/V	↔	↔
	R D	↔	N/V	N/V	↔	↔
	R R	↔	N/V	N/V	↔	↔
Packet is missing cell(s)	U D	Δ	N/V	N/V	"Partial Packet Error" Bit 4	—
	R D	⊗ Δ	"Partial Packet Error" Bit 4	N/V	"Partial Packet Error" Bit 4	≠
	R R		"Partial Packet Error" Bit 4	N/V	"Partial Packet Error" Bit 4	"Transport Error" Bit 6



**RDMA Write (no Immediate Data) Operation****Table 3: RDMA Write (no Immediate Data) Operation**

			<b>RDMA Write Operation</b> (no Immediate Data)	<b>RDMA Write Operation</b> (no Immediate Data)	<b>RDMA Write Operation</b> (no Immediate Data)	<b>RDMA Write Operation</b> (no Immediate Data)
			Operation Initiated on the Local Endpoint	Operation Initiated on the Local Endpoint	Operation Initiated on the Local Endpoint	Operation Initiated on the Local Endpoint
Work Queue Error			Error Source and/or Detection on <b>Local</b> Endpoint	Error Source and/or Detection on <b>Local</b> Endpoint	Error Source and/or Detection on <b>Remote</b> Endpoint	Error Source and/or Detection on <b>Remote</b> Endpoint
Error Description			Error Reported to <b>Local</b> endpoint	Error Reported to <b>Remote</b> Endpoint	Error Reported to <b>Remote</b> Endpoint	Error Reported to <b>Local</b> endpoint
No descriptors on the Receive Queue	U D		N/V	N/V	N/V	N/V
	R D		N/V	N/V	N/V	N/V
	R R		N/V	N/V	N/V	N/V
Too Many Descriptors Posted to a queue	U D	⚰	"VI Overrun" A 4	≠	N/V	N/V
	R D	⚰	"VI Overrun" A 4	≠	N/V	N/V
	R R	⚰	"VI Overrun" A 4	≠	N/V	N/V
Descriptor format error	U D		"Local Format Error" Bit 1	—	N/V	N/V
	R D		"Local Format Error" Bit 1	≠	N/V	N/V
	R R		"Local Format Error" Bit 1	≠	N/V	N/V

**RDMA Write (no Immediate Data) Operation**

Descriptor length error	U D		"Local Length Error" Bit 3	—	N/V	N/V
	R D		"Local Length Error" Bit 3	≠	N/V	N/V
	R R		"Local Length Error" Bit 3	≠	N/V	N/V
Invalid Doorbell Token or Next Field	U D	☠	"Post Descriptor Error" A 1	≠	N/V	N/V
	R D	☠	"Post Descriptor Error" A 1	≠	N/V	N/V
	R R	☠	"Post Descriptor Error" A 1	≠	N/V	N/V
The NIC can't access descriptor data segments due to a TPT fault, but can access the Control Segment.	U D		"Local Protection Error" Bit 2	—	N/V	N/V
	R D		"Local Protection Error" Bit 2	≠	N/V	N/V
	R R		"Local Protection Error" Bit 2	≠	N/V	N/V
Can't write to descriptor control segment	U D	☠	"Completion Protection Error" A 9	≠	N/V	N/V
	R D	☠	"Completion Protection Error" A 9	≠	N/V	N/V
	R R	☠	"Completion Protection Error" A 9	≠	N/V	N/V
Can't read from a data buffer	U D		"Local Protection Error" Bit 2	—	N/V	N/V
	R D		"Local Protection Error" Bit 2	≠	N/V	N/V
	R R		"Local Protection Error" Bit 2	≠	N/V	N/V

**RDMA Write (no Immediate Data) Operation**

Can't write to a data buffer	U D		N/V	N/V	N/V	N/V
	R D		N/V	N/V	N/V	N/V
	R R		N/V	N/V	N/V	N/V
Can't read from an RDMA buffer	U D		N/V	N/V	N/V	N/V
	R D		N/V	N/V	N/V	N/V
	R R		N/V	N/V	N/V	N/V
Can't write to an RDMA buffer	U D		N/V	N/V	Ø	—
	R D		N/V	N/V	"RDMA Write Protection Error" A 5	≠
	R R		N/V	N/V	OPT "RDMA Write Protection Error" A 5	"RDMA Protection Error" Bit 7
Can't write to a Completion Queue	U D	☠	"Completion Protection Error" A 9	≠	N/V	N/V
	R D	☠	"Completion Protection Error" A 9	≠	N/V	N/V
	R R	☠	"Completion Protection Error" A 9	≠	N/V	N/V
RDMA Read disabled on VI	U D		N/V	N/V	N/V	N/V
	R D		N/V	N/V	N/V	N/V
	R R		N/V	N/V	N/V	N/V

**RDMA Write (no Immediate Data) Operation**

RDMA Write disabled on VI	U D		N/V	N/V	Ø	—
	R D		N/V	N/V	“RDMA Write Protection Error” A 5	≠
	R R		N/V	N/V	OPT “RDMA Write Protection Error” A 5	“RDMA Protection Error” Bit 7
Packet arrived with a CRC Error	U D	⊗ Δ	N/V	N/V	—	—
	R D	⊗ Δ	N/V	N/V	“RDMA Write Data Error” A 6	≠
	R R		N/V	N/V	OPT “RDMA Write Data Error” A 6	“Transport Error” Bit 6
Partial packet placed on the wire, requires an additional error bit be set.	U D	⊗ Δ	“Partial Packet Error” Bit 4	—	—	—
	R D	⊗ Δ	“Partial Packet Error” Bit 4	≠	“RDMA Write Packet Abort” A 7	≠
	R R		“Partial Packet Error” Bit 4	≠	OPT “RDMA Write Packet Abort” A 7	“Transport Error” Bit 6
Packet arrived out of sequence	U D	O K	N/V	N/V	—	—
	R D		N/V	N/V	“RDMA Write Transport Error” A 10	≠
	R R		N/V	N/V	OPT “RDMA Write Transport Error” A 10	“Transport Error” Bit 6
Packet did not arrive	U D	Δ	N/V	N/V	—	—
	R D		N/V	N/V	“RDMA Write Transport Error” A 10	≠
	R R		N/V	N/V	OPT “RDMA Write Transport Error” A 10	“Transport Error” Bit 6

**RDMA Write (no Immediate Data) Operation**

Packet with duplicate sequence arrived	U D	↔	N/V	N/V	↔	↔
	R D	↔	N/V	N/V	↔	≠
	R R		N/V	N/V	↔	"Transport Error" Bit 6
Packet is missing cell(s)	U D	Δ	"Partial Packet Error" Bit 4	—	—	—
	R D	⊗ Δ	"Partial Packet Error" Bit 4	N/V	"RDMA Write Transport Error" A 10	≠
	R R		"Partial Packet Error" Bit 4	N/V	<b>OPT</b> "RDMA Write Transport Error" A 10	"Transport Error" Bit 6

## RDMA Read Operation

Table 4: RDMA Read Operation

			RDMA Read Operation	RDMA Read Operation	RDMA Read Operation	RDMA Read Operation
			Operation Initiated on the Local Endpoint	Operation Initiated on the Local Endpoint	Operation Initiated on the Local Endpoint	Operation Initiated on the Local Endpoint
Work Queue Error			Error Source and/or Detection on <b>Local</b> Endpoint	Error Source and/or Detection on <b>Local</b> Endpoint	Error Source and/or Detection on <b>Remote</b> Endpoint	Error Source and/or Detection on <b>Remote</b> Endpoint
Error Description			Error Reported to <b>Local</b> endpoint	Error Reported to <b>Remote</b> Endpoint	Error Reported to <b>Remote</b> Endpoint	Error Reported to <b>Local</b> endpoint
No descriptors on the Receive Queue	U D		N/V	N/V	N/V	N/V
	R D		N/V	N/V	N/V	N/V
	R R		N/V	N/V	N/V	N/V
Too Many Descriptors Posted to a queue	U D	⚠	"VI Overrun" A 4	≠	N/V	N/V
	R D	⚠	"VI Overrun" A 4	≠	N/V	N/V
	R R	⚠	"VI Overrun" A 4	≠	N/V	N/V
Descriptor format error	U D	N / S	"Local Format Error" Bit 1	—	N/V	N/V
	R D		"Local Format Error" Bit 1	≠	N/V	N/V
	R R		"Local Format Error" Bit 1	≠	N/V	N/V

**RDMA Read Operation**

Descriptor length error	U D	N / S	N/V	N/V	N/V	N/V
	R D		"Local Length Error" Bit 3	≠	N/V	N/V
	R R		"Local Length Error" Bit 3	≠	N/V	N/V
Invalid Doorbell Token or Next Field	U D	☠	"Post Descriptor Error" A 1	≠	N/V	N/V
	R D	☠	"Post Descriptor Error" A 1	≠	N/V	N/V
	R R	☠	"Post Descriptor Error" A 1	≠	N/V	N/V
The NIC can't access descriptor data segments due to a TPT fault, but can access the Control Segment.	U D	N / S	N/V	N/V	N/V	N/V
	R D		"Local Protection Error" Bit 2	≠	N/V	N/V
	R R		"Local Protection Error" Bit 2	≠	N/V	N/V
Can't write to descriptor control segment	U D	☠	"Completion Protection Error" A 9	≠	N/V	N/V
	R D	☠	"Completion Protection Error" A 9	≠	N/V	N/V
	R R	☠	"Completion Protection Error" A 9	≠	N/V	N/V
Can't read from a data buffer	U D		N/V	N/V	N/V	N/V
	R D		N/V	N/V	N/V	N/V
	R R		N/V	N/V	N/V	N/V

## RDMA Read Operation

Can't write to a data buffer	U D	N / S	N/V	N/V	N/V	N/V
	R D		"Local Protection Error" Bit 2	≠	N/V	N/V
	R R		"Local Protection Error" Bit 2	≠	N/V	N/V
Can't read from an RDMA buffer	U D	N / S	N/V	N/V	N/V	N/V
	R D		N/V	N/V	OPT "RDMA Read Protection Error" A 8	"RDMA Protection Error" Bit 7
	R R		N/V	N/V	OPT "RDMA Read Protection Error" A 8	"RDMA Protection Error" Bit 7
Can't write to an RDMA buffer	U D		N/V	N/V	N/V	N/V
	R D		N/V	N/V	N/V	N/V
	R R		N/V	N/V	N/V	N/V
Can't write to a Completion Queue	U D	☠	"Completion Protection Error" A 9	≠	N/V	N/V
	R D	☠	"Completion Protection Error" A 9	≠	N/V	N/V
	R R	☠	"Completion Protection Error" A 9	≠	N/V	N/V
RDMA Read disabled on VI	U D		N/V	N/V	N/V	N/V
	R D		N/V	N/V	OPT "RDMA Read Protection Error" A 8	"RDMA Protection Error" Bit 7
	R R		N/V	N/V	OPT "RDMA Read Protection Error" A 8	"RDMA Protection Error" Bit 7



**RDMA Read Operation**

RDMA Write disabled on VI	U D		N/V	N/V	N/V	N/V
	R D		N/V	N/V	N/V	N/V
	R R		N/V	N/V	N/V	N/V
RDMA Read not supported in this implementation	U D	N / S	"Local Format Error" Bit 1	—	N/V	N/V
	R D		"Local Format Error" Bit 1	≠	N/V	N/V
	R R		"Local Format Error" Bit 1	≠	N/V	N/V
Packet arrived with a CRC Error	U D		N/V	N/V	N/V	N/V
	R D	⊗ Δ	"Transport Error" Bit 6	≠	≠	"Transport Error" Bit 6
	R R		"Transport Error" Bit 6	≠	≠	"Transport Error" Bit 6
Partial packet placed on the wire, requires an additional error bit be set.	U D		N/V	N/V	N/V	N/V
	R D	⊗ Δ	"Partial Packet Error" Bit 4	≠	≠	"Transport Error" Bit 6
	R R	±	"Partial Packet Error" Bit 4 "Transport Error" Bit 6	≠	≠	"Transport Error" Bit 6
Packet arrived out of sequence	U D		N/V	N/V	N/V	N/V
	R D		"Transport Error" Bit 6	≠	≠	"Transport Error" Bit 6
	R R		"Transport Error" Bit 6	≠	≠	"Transport Error" Bit 6

**RDMA Read Operation**

Packet did not arrive	U D		N/V	N/V	N/V	N/V
	R D		"Transport Error" Bit 6	≠	≠	"Transport Error" Bit 6
	R R		"Transport Error" Bit 6	≠	≠	"Transport Error" Bit 6
Packet with duplicate sequence arrived	U D		N/V	N/V	N/V	N/V
	R D		↔	↔	↔	↔
	R R		↔	↔	↔	↔
Packet is missing cell(s)	U D		N/V	N/V	N/V	N/V
	R D	⊗ Δ	"Partial Packet Error" Bit 4	≠	≠	"Transport Error" Bit 6
	R R		"Partial Packet Error" Bit 4	≠	≠	"Transport Error" Bit 6

## Other Errors

Table 5: Other Errors

			Misc. Operation	Misc. Operation	Misc. Operation	Misc. Operation
			Operation Initiated on the Local Endpoint	Operation Initiated on the Local Endpoint	Operation Initiated on the Local Endpoint	Operation Initiated on the Local Endpoint
Work Queue Error			Error Source and/or Detection on <b>Local</b> Endpoint	Error Source and/or Detection on <b>Local</b> Endpoint	Error Source and/or Detection on <b>Remote</b> Endpoint	Error Source and/or Detection on <b>Remote</b> Endpoint
Error Description			Error Reported to <b>Local</b> endpoint	Error Reported to <b>Remote</b> Endpoint	Error Reported to <b>Remote</b> Endpoint	Error Reported to <b>Local</b> endpoint
Completion Queue Overrun Note: Detection is not required by the VI Arch. Spec. 1.0. This error must be detected by implementations where a CQ Overrun could cause corruption of data or delivery that does not meet the requirements of the specific reliability level. (i.e. out of order).	<b>U</b> <b>D</b>		"Catastrophic Error" A 11	≠	"Catastrophic Error" A 11	≠
	<b>R</b> <b>D</b>		"Catastrophic Error" A 11	≠	"Catastrophic Error" A 11	≠
	<b>R</b> <b>R</b>		"Catastrophic Error" A 11	≠	"Catastrophic Error" A 11	≠
VI transitions to the Error State.  For Descriptors Pending or Posted, Flush all Descriptors.	<b>U</b> <b>D</b>		"Descriptor Flushed" Bit 5	≠	"Descriptor Flushed" Bit 5	≠
	<b>R</b> <b>D</b>		"Descriptor Flushed" Bit 5	≠	"Descriptor Flushed" Bit 5	≠
	<b>R</b> <b>R</b>		"Descriptor Flushed" Bit 5	≠	"Descriptor Flushed" Bit 5	≠
VI Application calls VipDisconnect().  For Descriptors Pending, Flush all Descriptors.	<b>U</b> <b>D</b>		"Descriptor Flushed" Bit 5	≠	"Descriptor Flushed" Bit 5	≠
	<b>R</b> <b>D</b>		"Descriptor Flushed" Bit 5	≠	"Descriptor Flushed" Bit 5	≠
	<b>R</b> <b>R</b>		"Descriptor Flushed" Bit 5	≠	"Descriptor Flushed" Bit 5	≠

## Other Errors

VI Application calls VipDisconnect(). No Descriptors posted	U D		OK	≠	OK	≠
	R D		OK	≠	OK	≠
	R R		OK	≠	OK	≠
≠ Connection Broken due to an error	U D	±	"Descriptor Flushed" Bit 5 "Connection Lost" A 2	"Descriptor Flushed" Bit 5 "Connection Lost" A 2	"Descriptor Flushed" Bit 5 "Connection Lost" A 2	"Descriptor Flushed" Bit 5 "Connection Lost" A 2
	R D	±	"Descriptor Flushed" Bit 5 "Connection Lost" A 2	"Descriptor Flushed" Bit 5 "Connection Lost" A 2	"Descriptor Flushed" Bit 5 "Connection Lost" A 2	"Descriptor Flushed" Bit 5 "Connection Lost" A 2
	R R	±	"Descriptor Flushed" Bit 5 "Connection Lost" A 2	"Descriptor Flushed" Bit 5 "Connection Lost" A 2	"Descriptor Flushed" Bit 5 "Connection Lost" A 2	"Descriptor Flushed" Bit 5 "Connection Lost" A 2
Interconnect link has failed <sup>2</sup>	U D	±	≠ "Transport Error" Bit 6	≠ "Transport Error" Bit 6	≠ "Transport Error" Bit 6	≠ "Transport Error" Bit 6
	R D	±	≠ "Transport Error" Bit 6	≠ "Transport Error" Bit 6	≠ "Transport Error" Bit 6	≠ "Transport Error" Bit 6
	R R	±	≠ "Transport Error" Bit 6	≠ "Transport Error" Bit 6	≠ "Transport Error" Bit 6	≠ "Transport Error" Bit 6
Invalid Operation Type	U D		"Local Format Error" Bit 1	—	"Local Format Error" Bit 1	—
	R D		"Local Format Error" Bit 1	≠	"Local Format Error" Bit 1	≠
	R R		"Local Format Error" Bit 1	≠	"Local Format Error" Bit 1	"Remote Descriptor Error" Bit 8

<sup>2</sup> Link Failures may be reported in different ways depending on the Reliability Level, the state of the VI when the error occurred and the specific implementation.

